SOVIET TANKS IN *BARBAROSSA* 1941

STEVEN J. ZALOGA

ILLUSTRATED BY FELIPE RODRÍGUEZ

NEW VANGUARD 342

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SOVIET TANKS IN *BARBAROSSA* 1941

INTRODUCTION

Contrary to popular myths about the battle of Kursk, the tank battles of Operation *Barbarossa* were the largest on the Russian Front in World War II. By 1941, the Red Army had built up a tank force more numerous than the tank arsenals of the rest of the world combined. Yet, in a few short weeks, the best of the Soviet tank divisions had been destroyed. This book examines the growth of the Soviet tank force before the war, as well as the problems that led to its catastrophic defeat in the summer of 1941.

DOCTRINE AND ORGANIZATION

The Red Army was enmeshed in considerable turmoil in the years before Operation *Barbarossa*, in part due to Josef Stalin's dystopian political intrigues, and in part due to the attempts to adjust tactics and doctrine to the lessons of Blitzkrieg.

The purges that tortured Soviet Russia from 1936 to 1941 are among some of the most grotesque passages in modern European history. In 1936, Stalin began to stifle any possible political opposition in a series of show trials and executions. In June 1937, he turned his malignant attention to the Red Army. One of the most important victims was Mikhail Tukhachevskiy, one of the primary advocates for Army mechanization. Stalin had borne a personal grudge against Tukhachevskiy ever since the 1920 Russo–Polish War. Stalin feared the popular and brilliant leader of the Army as a possible Bonaparte. To remove any threat from the military, he began having the Army leadership slaughtered. Tukhachevskiy was among the first to go, shot in June 1937.

The T-35 heavy tank was the pride of the Red Army, appearing in numerous parades in Moscow, Leningrad, and Kiev in the 1930s. In reality, it was a mechanical nightmare and most of the 50 tanks in service in 1941 broke down before seeing combat.

Over the next few years, the Red Army lost three of five marshals, 14 of 16 Army commanders, 60 of 67 corps commanders, 136 of 199 divisional commanders, and 221 of 397 brigade commanders, apart from thousands of lower-ranking officers. Particularly hard-hit were the new mechanized formations which were viewed as hotbeds of pro-Tukhachevskiy sedition. Those spared were mostly Stalin's incompetent cronies including defense minister Klimenti Voroshilov and artillery chief Grigoriy Kulik. As a result of the purges, discussion of mechanized doctrine and tactics became politicized and potentially fatal to the unwary. The purges not only wiped out much of the finest Red Army leadership, but were also extended to the murder of the leadership of the defense industry including the managers of the tank plants and the principal tank designers.

The T-26 light tank was the most numerous Soviet tank in service in 1941. This is the most common subtype, the T-26 obr. 1933. It was fitted with the same turret with a 45mm gun as the contemporary BT-5 cavalry tank.

In the mid-1930s, the Red Army had four mechanized corps (MK: *Mekhanizirovanniy korpus*) as well as numerous smaller formations. There was a total of 32 tank brigades, consisting of 25 light brigades with T-26 or BT tanks, four heavy brigades with T-28 and T-35 tanks, and three reserve brigades. Rifle divisions were allotted a tank battalion with 22 T-26 and 16 T-37/T-38 tanks, and cavalry divisions were allotted a cavalry tank regiment with 64 BT cavalry tanks. At the time, the Red Army had about 110 first-line infantry divisions and 32 cavalry divisions.

In the midst of the purges in November 1937, the Red Army tank force underwent a reorganization as part of the MP-37 mobilization plan. The four existing mechanized corps were renamed and renumbered, becoming the 10th, 15th, 20th, and 25th Tank Corps. The new formations were enlarged, each having 560 tanks, 118 artillery pieces, and 12,710 troops. This was done by absorbing eight of the BT tank brigades into the new corps. The other 12 light tank brigades were evenly split between BT and T-26 units and their strength increased from 157 to 278 tanks each by enlarging platoon strength to five tanks. The three reserve brigades were redesignated as tank regiments of the high command reserve (RGK) and authorized 190 T-26 tanks each. There were plans to increase the number of heavy tank brigades from four to nine, with 148 tanks in the T-35 brigades and 183 in the T-28 brigades.

It is worth noting that these strength figures refer to the number of combat tanks in each unit, also referred to as "line tanks." These units were also authorized training tanks, so for example the tank corps had 98 training tanks in addition to their 560 combat tanks and the light tank brigades had 49 training tanks. As of 1938, only 32 tank brigades had been organized of the 40 that were planned. These larger tank units were called the "Armored Force of the Supreme Command Reserve" to distinguish them from smaller tank units assigned to the infantry and cavalry.

A KhT-133 flamethrower tank of the 133rd Separate Chemical Tank Battalion lost during the fighting with the Finnish Army near Prääza on September 9, 1941. The flamethrower versions of the T-26 can be distinguished by the stubby KS-25 flamethrower nozzle and the transfer of the turret to the right side of the hull to provide internal space for the fuel tank. (SA-kuva)

First-line rifle divisions were allotted a separate tank battalion, with plans to deploy 160 battalions with a strength of 36 tanks, including 20 T-37 or T-38 small tanks, for an overall total of 5,700 tanks. There were 24 cavalry tank regiments with 50 BT tanks each for an overall total of 1,200 tanks. The Chemical Force had three chemical tank brigades and four chemical tank battalions which included a mixture of flamethrower tanks and chemical gas dispersal tanks, totaling 920 tanks. The new 1937–38 order of battle reorganization was expected to take five years with the overall Red Army combat strength rising from 11,300 line tanks in 1937 to 17,400 in 1943.

The Red Army was involved in a number of combat actions in the late 1930s involving tank units. Soviet tank crews were dispatched to Spain in 1936 to assist the Republican army in the civil war. This provided useful technical information on international tank development and the performance of the T-26 and BT-5 tanks. However, the tactical lessons from the conflict were murky since the tanks were mainly operated in an improvised fashion on a very small scale by poorly trained Spanish crews.

The Red Army confronted Japan's Kwangtung Army along the Mongolian border near Lake Khasan in 1938, prompting the Kremlin to send further reinforcements into Mongolia, including the 6th and 11th Tank Brigades. A major conflict broke out in earnest in the summer of 1939 at Khalkin Gol. Soviet armored units played a central role in the rout of the Kwangtung Army. The Japanese Type 89 and Type 97 medium tanks proved no match for the BT-7 fast tank.

A pair of early BT-5 obr. 1933 which got involved in a road accident and burned out near Savinova village on September 4, 1941. The initial version of the BT-5 used a circular turret with a small bustle at the rear.

On September 17, 1939, the Soviet Union invaded eastern Poland as a consequence of the secret Molotov–Ribbentrop Pact with Nazi Germany. Among the invading units were the 15th and 25th Tank Corps and 14 tank brigades totaling some 3,542 tanks. The Soviet thrusts were not met with any significant resistance since the Poles were already preoccupied with the Germans. Combat losses included 42 tanks, and a further 429 suffered mechanical breakdowns. The Polish invasion was a hasty mess, suffering from poor planning and preparation. Logistics proved to be a nightmare since the tank units depended upon an influx of trucks from the civilian sector that often did not arrive in time or that were so mechanically exhausted as to be useless. German observers concluded that the Red Army was unprepared for a war of maneuver.

The standard production series of BT-5 tanks introduced a new universal turret also used on the T-26 obr. 1933. In contrast to the initial BT-5 turrets, the bustle was larger. (SA-kuva)

In the wake of the Polish campaign, the four tank corps were disbanded. In their place came four shrunken motorized divisions with about 275 tanks apiece, about half the strength of the previous corps. The Red Army continued in this retrograde direction, turning away from Tukhachevskiy's deep battle ideas and to a closer subordination of the tank units to the infantry and cavalry.

In November 1939, the Red Army invaded Finland, expecting a quick victory. A total of 2,290 tanks were used in the initial phase of the attack. A British army report from 1940 noted that the Red Army "had an almost child-like faith in tanks, used in very large numbers in support of every major action irrespective of whether the terrain is suitable for the action of such weapons." The Finns fought the Russians to a bloody standstill that lasted more than three months and cost the Red Army more than 350,000 casualties. Tank losses totaled 3,178 tanks of all types of which 1,903 were combat losses and 1,275 were mechanical breakdowns and accidents. The Finnish campaign was humiliating evidence of the disarray of the Red Army, and the consequences of the slaughter of the Army's professional officers. The inglorious performance of the Red Army in Finland had dire strategic consequences since it convinced Hitler that the Soviet Union was a paper tiger. This reinforced the Führer's inclination to attack his erstwhile ally.

Factories in the Leningrad area added *ekranovka* (appliqué armor) to many light tanks as a result of the 1940 combat experiences in Finland. The T-26-1 obr. 1939 on the left and T-50 on the right show the factory-applied appliqué armor. Both were captured by the Finnish army in 1941 and are seen here at Varkaus on February 15, 1942. (SA-kuva)

The appearance of the new Soviet tanks in 1941 caused tank panic in the German infantry due to the lack of suitable anti-tank weapons. In the foreground is a T-34 obr. 1941 with the Mariupol cast turret and F-34 gun, and in the background, a KV-1 with the F-32 gun and the thickened 90mm turret. These are from the 7th Tank Division, 6th Mechanized Corps during the fighting for Grodno.

The German defeat of France and the British withdrawl in May–June 1940 shocked Moscow. Based on the experience of 1914–1918, Stalin and much of the Soviet leadership had expected that the war would drag on for years. Instead, the vaunted French Army was crushed in less than two months. The role of the Panzer force was obvious.

The Red Army continued to press ahead with the territorial aggrandizement permitted under the German–Soviet Pact. In June 1940, the Red Army invaded and occupied the three Baltic countries, once again making use of large numbers of tanks. In contrast to Finland, the Baltic campaign was short, and sarcastically described as "tourism with tanks." Later in the month, the Romanian provinces of Bessarabia and Northern Bukovina were seized.

In May 1940, the Red Army had 39 tank brigades. These consisted of 32 light tank brigades, three medium brigades with the T-28, one heavy brigade with the T-35, and three flamethrower brigades. The 20 cavalry divisions each had a single tank regiment and the rifle divisions had a further 98 separate tank battalions.

The Finnish embarrassment and the French shock forced Stalin to restrain his cronies' power in the Red Army and permit professional Soviet officers to undertake far-reaching reforms. After having disbanded the tank corps in 1939, the Red Army reversed course and decided to create nine new mechanized corps starting in June 1940. The 1940 mechanized corps was a true corps in the Western sense of the word, based around two tank divisions and a motorized division. Each tank division had a paper strength of two tank regiments, a motor rifle regiment, an artillery regiment, a scout battalion, and supporting troops. Each tank division was authorized 375 tanks, including 210 T-34 medium tanks, 63 KV heavy tanks, and 102 T-26 or BT light tanks. The motorized division consisted of two motor rifle regiments, a tank regiment, an artillery regiment, and supporting troops with 275 light tanks. The official strength of the new mechanized corps was three times the size of the pre-war corps, totaling 37,000 men, 1,031 tanks, 268 armored cars, and associated equipment.

In February 1941, the Red Army began to implement the new MP-41 mobilization plan. It envisioned tripling the tank force by the deployment of an incredible 30 mechanized corps that would include 60 tank divisions and 30 mechanized brigades. This would require an increase from the existing 14,600 line-tanks to an astounding 37,900 tanks by 1943. Under the plan, tank production would increase from 5,220 in 1941 to 18,500 in 1942 and a monumental 36,500 in 1943. It would also require a corresponding increase in the production of associated equipment including armored cars, trucks, artillery, and other equipment.

Mechanized Corps organization and equipment, June 1941						
Corps	Tank Div.	Mot. Div.	District*	Tanks	Modern**	Formation
1	1,3	163	Leningrad	1,039	15	Jan 41
10	21,24	198	Leningrad	469		Mar 41
3	2,5	84	Baltic	672	110	Jan 41
12	23,28	202	Baltic	933		Mar 41
6	4,7	29	Western	1,021	452	Jun 40
11	29,33	204	Western	237	31	Mar 41
13	25,31	208	Western	294		Feb 41
14	22,30	205	Western	520		Mar 41
17	27,36	209	Western	36		Mar 41
20	26,38	210	Western	93		Mar 41
2	11,16	15	Odessa	527	60	Jun 40
18	44,47	218	Odessa	280		Mar 41
4	8,32	81	Kiev	917	412	Jan 41
8	12,34	7	Kiev	921	171	Jun 40
9	20,35	131	Kiev	285		Nov 40
15	10,37	212	Kiev	733	135	Mar 41
16	15,39	240	Kiev	608		Mar 41
19	40,43	213	Kiev	280	7	Mar 41
22	19,41	215	Kiev	647	31	Mar 41
24	45,49	216	Kiev	222		Mar 41
25	50,55	219	Kharkov	300	20	Mar 41
23	48,51	220	Orel	413	21	Mar 41
7	14,18	1	Moscow	1,036	9	Jun 40
21	42,46	185	Moscow	98		Mar 41
26	52,56	103	N. Caucasus	184		Mar 41
27	9,53	221	Central Asia	356		Mar 41
28	6,54	236	Transcaucasus	869		Mar 41
30	58,60	239	Far East***	2,969		Mar 41
5	13,17	109	Transbaikal	963	33	Mar 41
29			Transbaikal	0		Mar 41
Other	57,59,61	69,82		1,639	83	
Total				19,561	1,590	

* During peacetime, the army's principal organizational structure was the military district (*voenniy okrug*). During wartime, these became Fronts, roughly equivalent to a western Army Group or German *Heeresgruppe*.

**T-34 & KV

***Includes other tanks in the Far East besides the 30th MK.

The first four of the new mechanized corps started organizing in June 1940; four more followed from November 1940 to February 1941. The final 21 corps began organizing on March 11, 1941. Usually, the new tank divisions used an existing tank brigade as the core.

The MP-41 mobilization plan threw the Red Army into chaos. To begin with, there were not enough tanks to fill out the new divisions. Since 1928, the Red Army received about 31,000 tanks, of which 25,636 were still in service on June 1, 1941. Of these, about 4,000 were allotted to organic tank units in rifle, cavalry, and chemical units, leaving a bit more than 20,000 for the corps. A June 1, 1941 report put the actual strength of serviceable tanks at 16,555, or less than half the required tanks since many older tanks were mechanically exhausted. The situation was even worse for other equipment.

There were still many T-27 tankettes in service in 1941, though relegated to secondary roles such as driver training. Here are a few T-27 tankettes found by Finnish forces near Värtsilä in July 1941. These were used in the Leningrad Military District as tractors. (SA-kuva)

There were only 36 percent of the trucks needed, 28 percent of the trailers, 23 percent of the motorcycles, and 45 percent of the tractors. Ammunition production for the new 76.2mm tank guns had been delayed and only about 12 percent of the needed ammunition was available when the war broke out. Most T-34 tanks went into action without any armor piercing ammunition, only high-explosive, and many tanks did not have even a single full load of ammunition.

The situation with trained tank troops was similarly debilitating. The Red Army was so desperate for corps commanders that the roster included N. V. Feklenko with the 19th MK, who had been a complete failure as a rifle corps commander at Khalkin Gol, and I. N. Khabarov with the 17th MK who had been court-martialed for his performance in Finland in 1940. Shortages were particularly acute among small unit commanders. Training on the new tanks was hampered by a lack of technical manuals for the new KV and T-34 tanks that were not published until the autumn of 1941 after the outbreak of the war. Most mechanized corps would be hollow shells for about two years until 1943.

A

LAND BATTLESHIPS DURING OPERATION *BARBAROSSA*

1. T-35, 68th Tank Regiment, 34th Tank Division, 8th Mechanized Corps, Battle of Brody-Dubno, June 1941. In 1933, Soviet tanks began to be painted in the new 3B camouflage dark green (*zashitniy tëmnozelëniy*), a dark, dull green oil paint. In 1939, work was undertaken to modernize this paint since it had no protective properties when photographed using infrared filters. The new paint, called 4BO dark green, was very similar in color to the previous 3B but used linseed oil as its base and had infrared protective qualities. The "O" in 4BO indicated linseed oil, while other automotive/aircraft paints with the same color but a different base had other suffixes such as 4BN that used nitrocellulose. An equivalent to this color is FS 24098. These new paints began replacing 3B in 1939, though 3B still remained in use as a primer. This T-35 was built when the 3B paint was still in use, but it may have been repainted in very similar 4BO before the war.

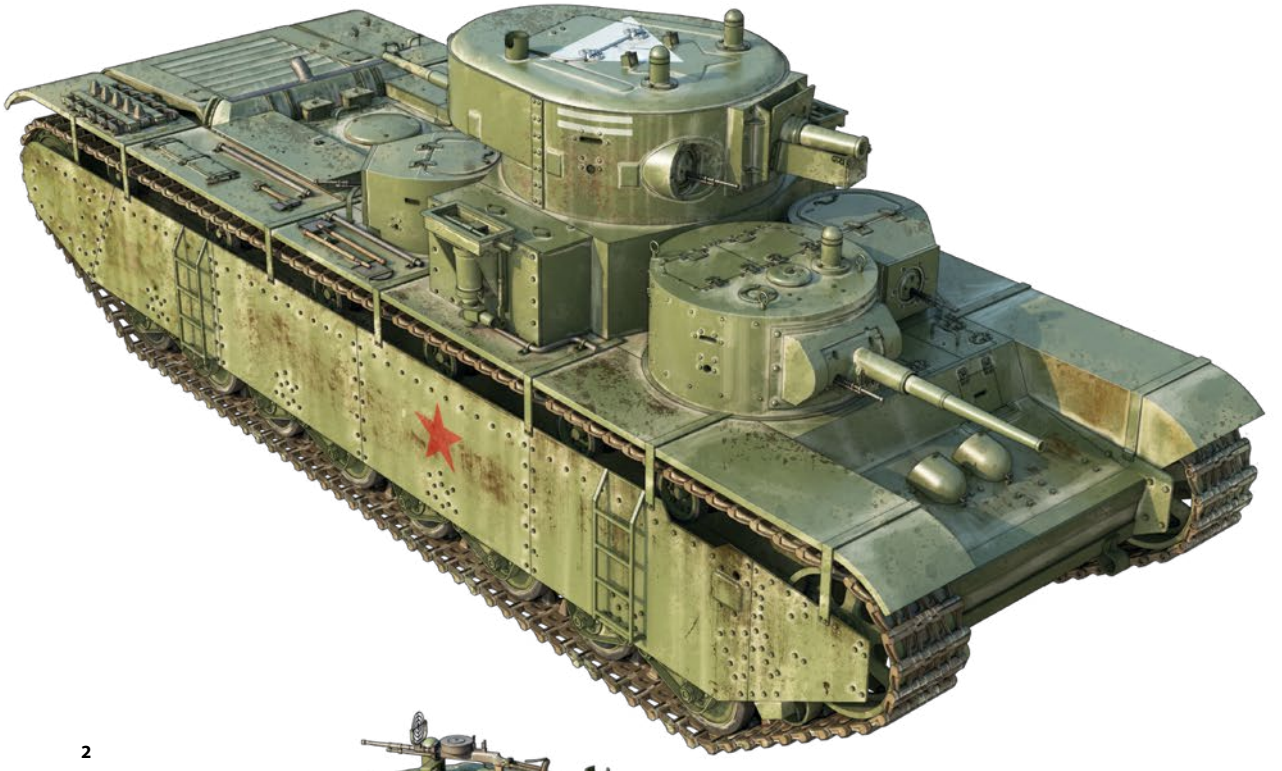
In June 1941, the 34th Tank Division had 51 of the 59 T-35 heavy tanks then in service, the remainder being in training, testing, or repair facilities. The T-35 units used a simple tactical insignia consisting of a single thin line for the 67th Tank Regiment and two lines as seen here for the 68th Tank Regiment.

The Red Army made extensive use of air identification markings during pre-war maneuvers to identify friendly tanks. The usual practice in 1941 was for the Front headquarters to issue a periodic order called *"Signaly opoznaniya svoikh voysk"* (Identification signals for our forces) that included the use of flares, ground flags, and vehicle markings covering a two-week period. Usually, there were four different markings over 16 days. For example, the Western Front order for August 31–September 16 consisted of four white vehicle roof markings: a 26cm radius white circle, a 60cm rectangle, a 60 cm triangle, and a 40x60cm rectangle. These were usually applied with whitewash.

In late June, the 8th Mechanized Corps was instructed to paint a white triangle as an air identification marking on the roofs of their tanks during the final days of June and the first few days of July. Due to confusion over the orders, some tanks had triangles painted on the turret rear and sides as well. This process was far from universal due to the chaos at the time as well as the lack of suitable paint.

2. T-28, 15th Tank Division, 8th Mechanized Corps, Southwestern Front, Ukraine July 1941. Soviet tanks began to use tactical numbers in the late summer of 1941 mainly for traffic control. These symbols were frequently based on encrypted numbers assigned at a battalion or regimental level. In this case, the marking is 3323 inside a rectangle. This tank also carries a square identity marking on the roof and on the hull rear.

1



2

To further add to the turmoil, two new military districts were added in the west to shield against any German invasion or to act as a springboard in the event of a Red Army advance west. The larger of these was the Western Special Military District (ZapOVO) deployed in occupied eastern Poland. The second was the Baltic Special Military District (PribOVO) located in Lithuania, Latvia, and Estonia. It should be noted here that the term "western military districts" often used in this book does not refer specifically to the ZapOVO, but rather includes all of the military districts involved in the *Barbarossa* campaign including the Leningrad, Moscow, Kiev, and Odessa military districts.

Eight of the new mechanized corps were deployed into these two districts. This created further chaos in the Red Army in 1941 since there were no suitable tank bases in these occupied countries. The corps were deployed to various cities and towns but there were few if any tank hangars, firing ranges, or exercise grounds. New construction for these units was slow since priority was given to the construction of new airbases for the Red Air Force and the new Molotov Line border defenses. As a result, training and preparedness suffered.

TECHNICAL FACTORS

Of the Red Army tanks in the western military districts in June 1941, only 10 percent were the new types such as the T-34 and KV. The two most significant types from a numerical standpoint were the T-26 light tank and BT fast (cavalry) tank.

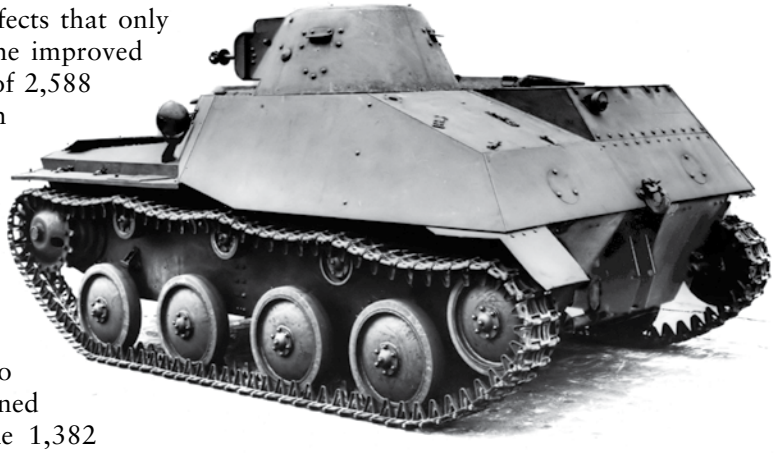
Small tanks

The Soviet Union bought 26 Carden Loyd Mark VI MG Carriers in 1930, but, rather than obtain a license, it built its own derivative as the T-27 tankette. It was intended as a reconnaissance vehicle and 3,342 were manufactured in 1931–34. The T-27s quickly fell out of favor due to their poor cross-country capability. There were plans to retire them in 1938 due to their obvious obsolescence, but many remained in service, mainly for driver training. In June 1941, there were 2,558 in service in their standard form, 33 as KhT-27 flamethrower tanks, and 182 as artillery tractors.

A T-37A amphibious tank, the standard Soviet reconnaissance tank in the mid-1930s. This is a "line tank" lacking a 71-TK-1 radio. (SA-kuva)

In 1930, the USSR bought eight Vickers Amphibian Light Tanks. Rather than pay for license production rights, they designed a derivate as the T-37 Small Tank (*Maliy Tank*). This became the standard reconnaissance tank of the Red Army. Production began

in 1933, but it had so many defects that only 39 were manufactured before the improved T-37A was introduced. A total of 2,588 were manufactured through 1936. About 17 percent of the production tanks were fitted with a 71-TK-1 radio, sometimes designated the T-37RT. The T-37 was followed in 1936 by the T-38 Small Tank that dispensed with the floatation incorporated into the fenders in favor of a redesigned and more buoyant hull. Of the 1,382 manufactured by 1939, only about 85 were fitted with a radio.



Neither the T-37A or T-38 had particularly good buoyancy or armor, and in 1939 the T-40 was introduced into service. This was a completely new design with torsion-bar suspension and an ample hull for better floatation in water. The armament was also increased to a 12.7mm DShK heavy machine gun. Only 132 had been delivered by June 1941. There were plans to substitute the T-50 infantry tank, but, since this would take some time, production began to shift to a simplified version, the T-30, that dropped the propellor and amphibious features. Since there were still components in the pipeline, T-40 production continued with a final total of 352 manufactured. Production of the T-30 began in August 1941, with 230 completed by the end of the year and a further 370 in 1942 for a total of 600.

The T-40 amphibious tank was intended to replace the pre-war T-37 and T-38 tanks. Only 374 were built by September 1941 when production switched to the simplified T-30 that lacked the amphibious features.

As mentioned below, the new T-50 infantry tank was cancelled in 1941 due to its cost and complexity. In its place, a simplified derivative of the T-30 was developed with a much smaller hull since the amphibious requirement had been dropped. This entered production in September 1941 as the T-60. At this point, the "Small Tank" category was dropped and the T-60 was classified as a light tank since it was intended to replace the T-26 and T-50.

The T-30 was an interim type between the T-40 and T-60. This is an example of a T-30 built at the Sverdlovsk plant with the new cast spoked wheels, and armed with the 20mm ShVAK aircraft cannon. (SA-kuva)

T-26 light tanks

The T-26 was based on the British Vickers six-ton export tank. This was the principal infantry-support tank of the Red Army, being deployed in the tank battalions attached to rifle divisions. Licensed production began in 1931 of the original type with small twin turrets. These were armed either with two DT machine guns or one DT machine gun and a low-velocity 37mm gun patterned on the French Hotchkiss gun. In 1933, production shifted to a version armed with the new 45mm tank gun.

Of the rarest Soviet tanks in 1941 was the new T-50 light tank. This tank served with the 2nd Tank Regiment, 7th Army and was lost on July 24, 1941 while attacking Finnish troops near the village of Kolatselga near Lake Tulmozero. (SA-kuva)

The Red Army had purchased licensed production rights for the German Rheinmetall 37mm anti-tank gun and manufactured it as the 37mm 1-K towed anti-tank gun starting in 1930. Although it was an excellent gun for the time, the Red Army wanted to use it as a general-purpose infantry-accompanying gun, and the 37mm shell was not large enough for a useful high-explosive fill. As a result, the gun was redesigned with a 45mm bore and entered large-scale production in 1933 as the 45mm 19-K towed anti-tank gun and 45mm 20-K tank gun. The 45mm projectile could accommodate 118g of explosive compared to only 25g with the 37mm gun. The Izhora steel plant designed a suitable turret to accommodate the 45mm gun and it was used on both the T-26 obr. 1933 light tank and the BT-5 fast tank. This proved to be an excellent gun when first used in combat during the Spanish Civil War in 1937–1939. It was outdated by 1941 once the Wehrmacht began upgrading the frontal armor of its tanks to 50mm. The 45mm gun could nominally penetrate 52mm of armor at 100m but German technical evaluation from Spain concluded that its armor penetration was degraded by the poor quality of the projectiles.

The T-26 obr. 1933 was built in two principal versions, with and without radio. These tanks were sometimes referred to as T-26 line tank (*lineyniy tank*) and T-26 radio tank (*radiyniy tank*), the later type fitted with a 71-TK-1 radio. In 1937, some tanks were fitted with the P-40 anti-aircraft machine gun mount, and the resulting tanks were sometimes identified as the T-26 anti-aircraft line tank (LTZ: *lineyniy tank zenitniy*) and T-26 anti-aircraft radio tank (RTZ: *radiyniy tank zenitniy*). About 48 percent of the single-turret T-26 tanks were fitted with radios.

Tanks of the early 1930s were not especially durable. The Red Army generally recorded engine hours as the metric for maintenance. The T-26 was expected to operate for 150 hours between medium rebuilds and 300 hours for a capital rebuild; engine hours roughly equated to 6–8km of travel per

B

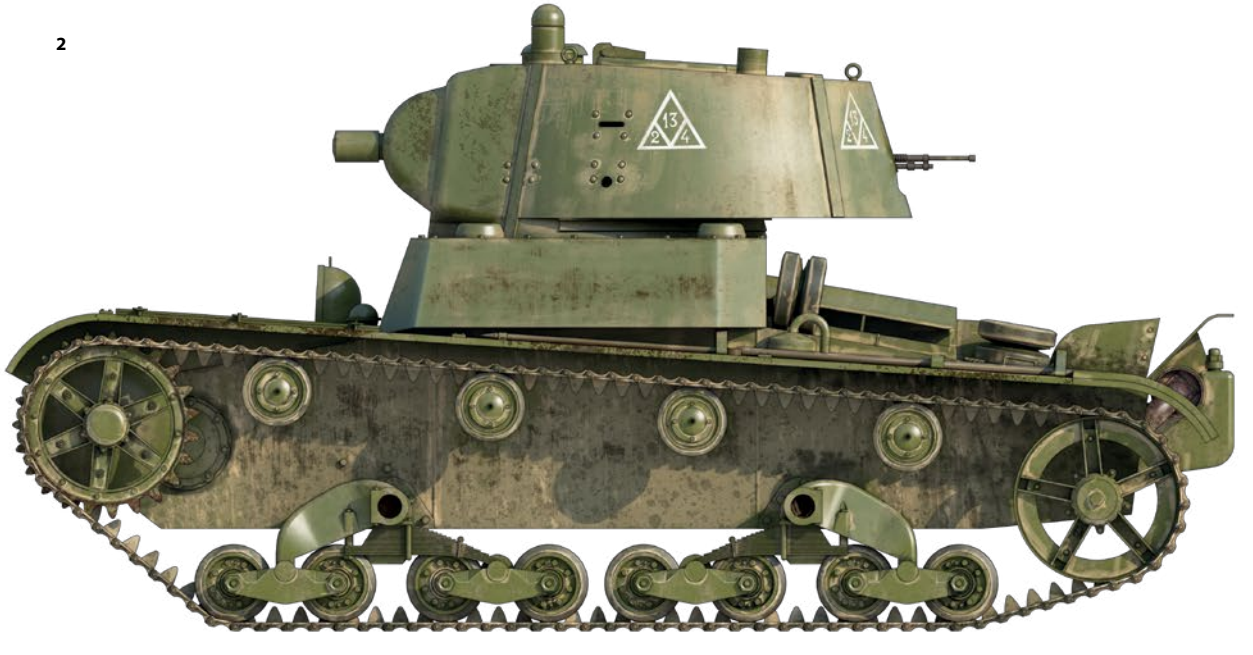
T26 DURING OPERATION *BARBAROSSA*

1. T-26 obr. 1939, 18th Tank Division, 7th Mechanized Corps, Western Front, Belarus, July 1941. In 1939, the NIIBT (Scientific Research Institute for Armored Technology) completed a research study for camouflage painting tanks and other equipment. Elaborate proposals were made using a family of new paints. Although officially accepted for service, very few tanks received the prescribed camouflage patterns. After the start of Operation *Barbarossa*, the 7th Mechanized Corps was supplied with the 7K yellow earth (*zheltozemlistiy*) and 6K dark brown (*tëmnokorichneviy*) paints to be applied in bands with the standard 4BO dark green base color. However, no pattern information was provided, and this particular battalion used an improvised zebra pattern on their tanks.

2, Kh-133, Separate Flamethrower Battalion, 37th Army, Southwestern Front, Kiev area, September 1941. In the late summer of 1941, the Red Army adopted standard tactical marking for tanks, mainly for traffic control purposes. The triangle was trisected. In the lower left was the company number (2), in the lower right was the platoon number (4) while in the upper center was a code number for the battalion, in this case, 13. This tank is finished in the standard 4BO dark green.

1

2



hour of engine use. Beyond minor repairs such as fixing a broken track, the more substantial repairs were undertaken by a network of rebuilding plants (*Remontniy Zavod*) located in each military district. A good example of the durability of the T-26 can be gauged by the lessons of the Spanish Civil War. During the Teruel campaign in December 1937–February 1938, the 104 T-26 tanks that were involved were repaired 586 times over 65 days of fighting, or roughly once every 11 days. Most of these were ordinary field repairs involving tracks and minor engine repairs. However, there were 63 medium and capital repairs requiring 58 engine replacements, 6 transmissions, 15 main clutches and 22 side clutches. In other words, every other tank had its engine replaced after only about two months of combat use. To help minimize wear on the tanks, the Spanish army turned to the use of transport trucks to move the tanks between battles.

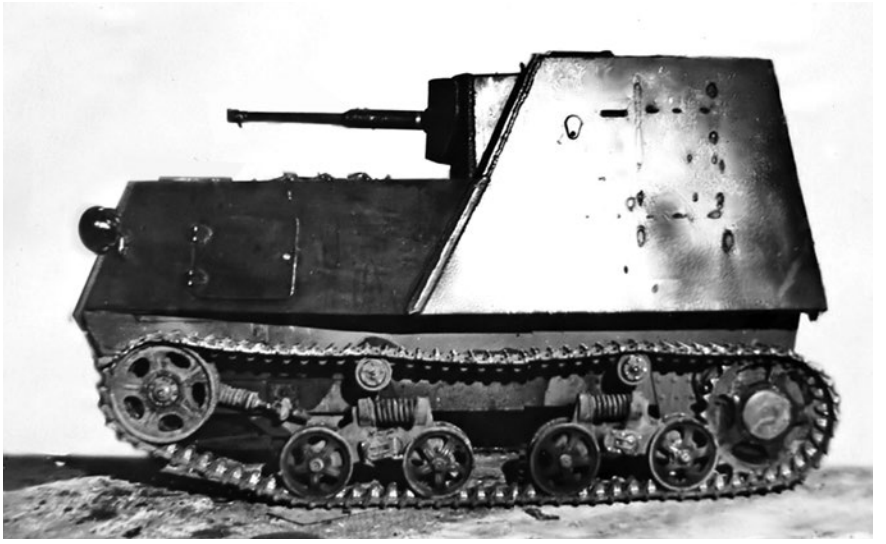
Soviet tank durability

Engine hours	Medium rebuild	Capital rebuild
T-35	150	300
T-28	200	400
BT-7	200	600
BT-2, BT-5	150	450
T-26	150	600
T-37, T-38	200	800

The T-26 underwent continual evolution through 1941. Lessons from the Spanish Civil War inspired some of these improvements, notably the introduction of a new welded turret in 1938 that offered better ballistic protection. Further improvements were introduced on the T-26 obr. 1939, also called the T-26-1, that introduced a turret with a stamped mantlet, improved hull side armor, gun stabilization, and many other small improvements. T-26 production continued through 1940 with a handful completed in 1941. Of the 10,300 T-26 tanks built, 2,038 were the early twin-turret type and the remainder with the 45mm gun turret. There were a further 1,457 T-26 flamethrower tanks built and 244 miscellaneous types for a grand total of 12,001. To put this in some perspective, T-26 production alone exceeded total worldwide tank production in 1930–1940.

About 700 obsolete Soviet tanks, mostly the T-18 (MS-1) were recycled in 1936–40 as improvised strongpoints in border fortification lines. These were used mainly in the territories annexed in 1939–40 including Poland, the Baltic, and Finland. This is a T-18 with its suspension removed and dug in near Reka Sestra (Rajajoki), northwest of Leningrad. (SA-kuva)

The intended replacement for the T-26 was the T-50 light tank. The program was delayed after evaluating a PzKpfw III purchased from Germany in 1940. Some of the features of the German tank were adapted to the T-50 design including the torsion bar suspension and a vison cupola. Due to the delays, the first T-50 tanks were not deployed until July 1941. Although an excellent design, it was complicated and expensive. The decision to shift production from Leningrad to a



The KhTZ-16 was an improvised light tank consisting of an armored shell added over a STZ-3 or similar tractor. It had 30mm frontal armor and was armed with a 45mm gun. This is the prototype completed in mid-August 1941. They fought in the Kharkov area in September–October 1941.

newly evacuated plant doomed the program and only 75 were completed in 1941–42.

One of the stranger light tanks to emerge in 1941 was the KhTZ-16 armored tractor (*bronetraktor*). On July 20, 1941 the State Defense Committee ordered the Kharkov Tractor Plant No. 264 to convert 2,000 STZ-3 and similar tractors into improvised tanks fitted with a 45mm gun in a fixed superstructure. The prototype was completed in August and a total of 142 were completed before the program collapsed due to the approach of German forces to Kharkov. These went into action with tank brigades near Kharkov in late September 1941. Similar NI armored tractor tanks were also built in the Odessa area, with 69 completed.

The KhT-26 flamethrower tank was based on the early twin-turret T-26 with one of the turrets removed. It was fitted with the KS-2 flamethrower with an effective range of about 40 meters. It was built in 1935, but most underwent modernization in 1938–40. This example was captured by the Finnish army. (SA-kuva)

BT cavalry tanks

The BT series of tanks were the principal cavalry tanks of the Red Army, classified as fast tanks (*bystrokhodny tank*). This was a license-built copy of the American Christie M.1930 tank. The initial BT-2 was fitted with the 5-K 37mm tank gun or an alternative twin machine gun armament due to gun shortages. In 1933, production shifted to the BT-5 that was armed with the new 45mm tank gun, fitted in the same *Izhora* turret as on the T-26 obr. 1933. The BT underwent a complete modernization in the mid-1930s as the BT-7. The BT-7 obr. 1935 used a new welded hull, an improved engine and many other upgrades; the turret was the same as on the BT-5. An improved turret with angled sides was introduced in 1937. The final version was the BT-7M that used the same V-2 diesel engine as the T-34 tank. There were some other versions such as the BT-7A artillery tank, fitted with a short 76mm gun.

This early production BT-2 obr. 1932 tank has come to grief in a roadside ditch in Portinhoikka on August 27, 1941. The early production tanks were armed with a 37mm B-3 gun in the small early turret without a rear turret bustle. This tank had been modernized during the periodic rebuilding at Repair Plant No. 48 in Kharkov. (SA-kuva)

T-28 medium tanks

The T-28 medium tank was heavily influenced by the fad for multiple turrets popularized in Britain such as the Vickers Mark III of 1930. It was also influenced by the Krupp Grosstraktor that was tested in the Soviet Union at the special proving ground at Kazan during the secret alliance between the Red Army and Reichswehr in the late 1920s. The T-28 was well armored by late 1920s standards with 30mm frontal armor and 20mm armor on the sides. The armament consisted of a short KT-28 76mm gun derived from the standard Soviet regimental gun, supplemented with DT machine guns in the main turret and sub-turrets. Although categorized as a medium tank, it was deployed in four RGK heavy tank brigades.

The KT-28 76mm gun had poor anti-tank performance, so, in 1939, the late production tanks were fitted with the lengthened L-10 76mm gun instead. Reports from the Spanish Civil War clearly pointed to the threat posed by modern anti-tank guns such as the German 37mm gun. As a result, in March 1938 the Leningrad Kirov Plant developed a set of appliqué armor to increase the turret armor to 50–58mm and the hull to 40mm. A total of 100 tanks with the L-10 gun were fitted with this at the factory during manufacture and an additional 26 tanks were upgraded during their periodic capital rebuilding. These were sometimes called T-28E (*Ekranirovanniy*: appliqué). The final dozen production tanks built in 1940 used a new conical turret design with improved armor.

T-28 production was modest by Soviet standards with only 503 completed in 1933–40. By 1941, there were still 456 in service, the discrepancy in totals due to heavy combat losses in Finland in 1939–40. The T-28 was never an especially popular tank as it was not well armored for its size, had mediocre firepower, and very sluggish automotive performance.

C

T34 DURING OPERATION *BARBAROSSA*

1. T-34 obr. 1940, 1st Moscow Proletarian Motorized Division, 7th Mechanized Division, Western Front, Belarus, July 1941. A small number of tanks of the Moscow parade division, the 1st Proletarian Motorized Division, were painted as recommended by the pre-war NIIBT camouflage program. This was based on the usual 4BO camouflage green with amoeba patterns of 7K yellow earth (*zheltozemlistiy*) and 6K dark brown (*tëmnokorichneviy*). This style of camouflage was uncommon, and the tanks may have been those that participated in the NIIBT Kubinka camouflage trials.

2. T-34-57 obr. 1941, 21st Tank Brigade, Troyanovo, 1941. Ten T-34 tank destroyers with 57mm guns were completed, mostly in the final August 1941 configuration of the T-34s of the Kharkov KhPZ No. 183 plant. This particular example used a Mariupol cast turret though others used a welded turret. Tank No. 20 was used by Major M. A. Lukin, the brigade commander, during the fighting near Kalinin on October 17, 1941 against the German 36.Infanterie-Division (Motorisiert). Lukin's tank was credited with destroying 15 German vehicles, 5 guns and up to 30 enemy soldiers before his tank was knocked out. He was posthumously decorated with the Hero of the Soviet Union award. The brigade's tanks were marked with tactical numbers on the hull side instead of the usual turret location.

1

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A T-28 obr. 1938 medium tank abandoned south of Olita, Lithuania on June 25, 1941 during fighting between the 7.Panzer-Divison and 5th Tank Division for the Nieman river crossings. The turret mounts an external rail antenna for its 71-TK-1 radio.

A T-34 obr. 1940 lost during the fighting in Ukraine in June 1941. It is fitted with the standard Mariupol 34.30.sb-2 cast turret with L-11 gun. It still features the PKO periscope in the turret hatch produced prior to March 1941 when the factory discontinued its use.

T-34 tanks

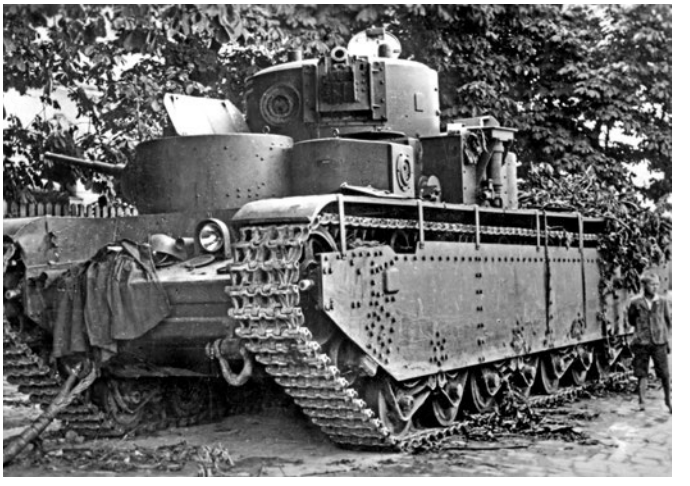
The T-34 was intended to replace the BT tanks. The initial prototypes had modest armor and still retained the 45mm gun. The lessons of the Spanish Civil War encouraged the adoption of thicker 45mm frontal armor, and it was well-sloped, inspired by the French FCM 36. The T-34 was supposed to be armed with the new F-32 76mm gun, but since it was not yet in serial production, the L-11 76mm gun was chosen as a temporary expedient. By September 1940, a superior alternative was becoming available, the longer F-34 76mm gun and this was approved as the standard armament for the T-34. Production of tanks with the L-11 gun was scheduled to end in January 1941, but it lingered in production until March 1941 when supply of the F-34 ramped up. The T-34 was manufactured from the outset with two alternate turrets, a cast design manufactured at the Mariupol steel plant, and a turret fabricated from welded plate. A total of 383 T-34 tanks with the L-11 gun were manufactured of which 268 were line tanks without radios and 115 were radio tanks fitted with the 71-TK-3 radio. The first serial production tanks with the F-34 gun appeared in late March 1941. By June 22, 1941, T-34 production had reached 1,225 tanks.

Due to concern over potential advances in German tank armor, work began in 1940 on mounting the ZiS-4 57mm gun in the T-34. This offered significantly better anti-armor penetration than the F-34, but inferior high explosive firepower. The plans were to build 400 T-34 tank destroyers with this weapon in 1941, though the F-34 would remain the standard armament on the remaining 2,400 T-34 tanks planned for 1941. A prototype with the 57mm gun was completed in April 1941 with plans to begin production in September 1941. In the event, only ten were completed and they were deployed with the 21st Tank Brigade during the fighting on the approach to Moscow in October 1941.

T-35 heavy tanks

The T-35 heavy tank was yet another example of the influence of British multi-turret designs, especially the Vickers A1E1 Independent. Development began in 1933 along with the T-28 medium tank, with both types sharing common main

turrets and machine gun turrets. In comparison to the T-28, the T-35 added two more turrets derived from those of the BT tank, armed with 45mm guns. Serial production began in 1934 and the final ten tanks built in 1938–39 had improved conical turrets. Due to its long length versus its width, the tank inevitably had very difficult steering. It was soon realized that it was impossible for the tank commander to direct all five turrets, and serial production was limited to 59 tanks plus two prototypes due to its glaring shortcomings. In 1941, the 34th Tank Division had 51 of these in service. Most were lost due to mechanical breakdown and only six are known to have been knocked out in combat.



T-35A obr. 1936, serial number 715-62, of the 68th Tank Regiment, 34th Tank Division that broke down while exiting the regimental base in Lvov. The regimental insignia of two horizontal white stripes can be seen on the turret side.

KV heavy tanks

Development of a new heavy tank began in 1938 with two competitive designs, the SMK and the T-100. These both had a main turret with a 76mm gun and a subsidiary turret with a 45mm gun. The resulting designs were exceptionally long and awkward. The Leningrad Kirov Plant proposed a single turret type that emerged in 1939 as the KV, named after defense minister Klimenti Voroshilov. The prototypes saw combat trials in Finland in late 1939, and the KV was selected to go into serial production.

The war in Finland suggested the need for a bunker-buster version, and the M-10 152mm howitzer was selected. At first, the type with the 76mm gun was referred to as the "KV with small turret" and the one with the 152mm gun as the "KV with large turret." In the event, they became the KV-1 and KV-2 after production started in April 1940. The KV was exceptionally well armored with 75mm frontal armor. By June 22, 1941, 424 KV-1 and 204 KV-2 had been manufactured.

The original production series of the KV-1 used the L-11 gun as seen here.

A KV-1 with appliqué armor that caught fire after running over an anti-tank mine during the fighting near Essoila near Lake Syamozero on September 1, 1941 after fighting with the Finnish army. (SA-kuva)

The KV series underwent a continual string of improvements. The KV-1 was initially armed with the Leningrad L-11 76mm gun as also used on the early T-34. There were some issues with the production of this gun as well as recurring mechanical problems that led to the decision to switch to the F-32 gun developed at Factory No. 92 in Gorkiy. A total of 144 KV-1 tanks were completed with the L-11 gun and production shifted to the F-32 in January 1941. A total of 792 KV-1 tanks were built with the F-32 through September 1941 when production shifted to the ZiS-5 gun. This gun had a lengthened tube and was essentially similar to the F-34 gun used on the T-34 tank at this time.

The KV-2 turret was redesigned in late 1940 to reduce its weight with a new turret design introduced on the production lines in November–December 1940 after 24 tanks with the early turret had been completed. The KV-2 had numerous mechanical shortcomings, aggravated by its excessive weight and awkward turret. Only 204 KV-2 tanks were completed when production halted in June 1941. Prototypes were tested with other guns including the 107mm ZiS-6, but these did not progress to serial production.

Intelligence reports in 1940 suggested the Germans were fielding new anti-tank guns. This led to a May 1941 scheme to add appliqué armor to most new tanks including the KV series. The appliqué for the KV-1 weighed an additional 2,940kg while the KV-2 added 3,925kg. A total of 120 to 130 KV-1 *Ekranirovanniy* (appliqué) tanks were built in June–August 1941 before the program was halted when it became evident that the threat had

A KV-1 that broke down during the fighting near Derevnya Aleksandrovka on September 19, 1941. This tank features the simplified turret introduced in the summer of 1941 with the turret side plate extending further back under the bustle. (SA-kuva)

been exaggerated. No KV-2 received the appliqué as the tank was already overweight. Instead of appliqué, attention shifted to thickening the KV-1 turret armor from 75mm to 90 mm with production of the thickened turret starting in July 1941. This was accompanied by a program to add appliqué to the front of the hull and the hull sides.

Soviet tank strength, June 1, 1941

Western Military Districts vs. Rear Area Districts

Type	Leningrad	Baltic	Western	Kiev	Odessa	Western Sub-total	Other	Total
T-27	101	87	395	394	103	1,080	1,478	**2,558**
T-37	118	61	233	492	177	1,081	1,240	**2,321**
T-38	61	85	199	75	48	468	661	**1,129**
T-40	1		30	84		115	17	**132**
T-26	531	507	1,271	1,698	214	4,221	4,526	**8,747**
BT	897	691	661	1,819	494	4,562	2,973	**7,535**
Flame	146	20	110	248	28	552	726	**1,278**
T-28	89	57	63	215		424	57	**481**
T-35				51		51	8	**59**
T-34	8	50	228	496	50	832	60	**892**
KV	6	78	97	278	10	469	35	**504**
Total	**1,958**	**1,636**	**3,287**	**5,850**	**1,124**	**13,855**	**11,781**	**25,636**

During peacetime, Soviet tanks were categorized in four levels. Category 1 was a new tank. Category 2 was an operational tank that might require minor repair. Category 3 was a tank sidelined due to serious mechanical problems needing capital rebuilding. Category 4 was an old tank destined for scrapping. Some old tanks in 1940–41 such as the MS-1 tank were dug in as static pillboxes. The accompanying chart shows the status of Soviet tanks at the outbreak of the war in the western military districts as well as in the Red Army as a whole.

Mechanical status of tanks in Western Military Districts in June 1941

	1	2	3	4	Total
T-27		534	211	342	**1,087**
T-37	12	511	279	279	**1,081**
T-38	4	270	96	68	**438**
T-40	113	2			**115**
T-26	807	2,795	251	368	**4,221**
BT	9	2,604	307	145	**3,065**
Flame tanks	12	475	44	11	**542**
T-28		283	94	47	**424**
T-35		42	5	4	**51**
T-34	794	37	1		**832**
KV-1	275	60	3		**338**
KV-2	124	7	1		**132**
Western MD Sub-total	**2,150**	**7,620**	**1,292**	**1,264**	**12,326**
(percent)	*17.4*	*61.8*	*10.5*	*10.2*	
USSR Total	**2,611**	**16,080**	**2,157**	**2,258**	**23,106**
(percent)	*11.3*	*69.6*	*9.3*	*9.8*	

A KV-2 of the 8th Tank Division, 4th Mechanized Corps abandoned in Army Repair Base No. 82 near the main Lvov train station and being inspected by troops of the 1.Gebirgs-Division after its capture. This unit had 31 KV-2 tanks at the start of the war.

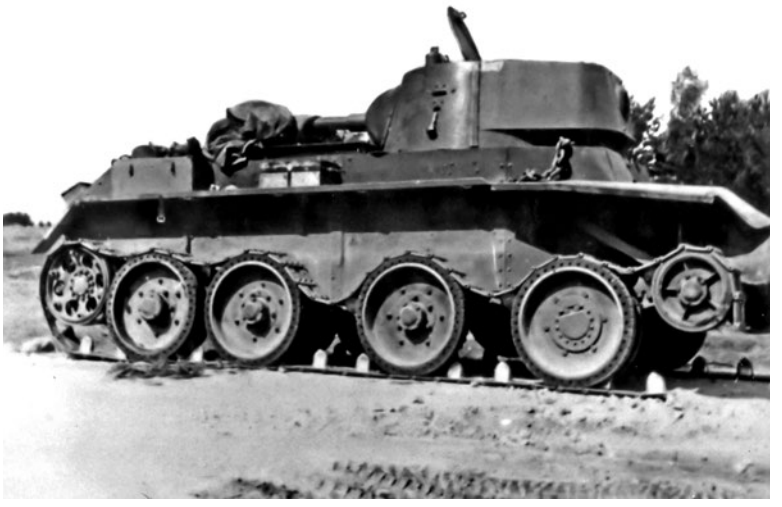
THE CAMPAIGN

Defense of the Baltic

Heeresgruppe Nord, spearheaded by Panzergruppe.4, attacked through the Baltic states towards Leningrad. There were two Soviet mechanized corps in the immediate border area, the 3rd MK in the Vilnius area and 12th MK near Šiauliai in Lithuania. Most of the 3rd MK fought against the northern elements of Heeresgruppe Mitte except for the 2nd Tank Division that was on its northern flank.

The 12th MK was dispersed to support neighboring Soviet infantry formations. Its tank divisions were short of fuel and did not reach the battle area until June 23–24, losing about 60 percent of their tank strength in several disjointed battles with German infantry divisions. By June 29, the corps was reduced to 50 tanks from its original strength of 806 tanks.

A BT-7M abandoned on the road southwest of Olita, Lithuania on June 25, 1941 during the fighting between the 7.Panzer-Division and the 5th Tank Division. This was the final production series of the BT tank, fitted with the same V-2 diesel engine as the T-34 tank.



The 2nd Tank Division of the 3rd MK advanced along the Kaunus road from its base at Ukmergė against elements of Panzergruppe.4. This division was well equipped with new tanks including the KV. Gen. Obst. Georg-Hans Reinhardt, commander of the XLI. Panzer Korps, recalled the first encounter with the KVs during these battles:

> A hundred of our tanks, about a third of which were

PzKpfw IVs, took their places for a counter-attack. Part of the force found itself directly facing the enemy, but most of the force was on the flanks. From three sides, they pummeled the steel monsters, but attempts to destroy them were futile. To the contrary, soon it was our tanks that were being knocked out. After a prolonged combat with the Russian giants, the German armored units began to withdraw to avoid being annihilated. Echeloned in length as well as in depth, the giant tanks approached closer and closer. One of these began approaching a Panzer that was trapped in a marshy pond. Without hesitation, the black monster simply rolled over it. At that moment, a German 15cm howitzer arrived. When its commander shouted that the enemy tanks were approaching, they opened sustained fire without causing the least damage. One approached the howitzer to within 100 meters. They fired again and the projectile struck with full force. The tank halted as though struck by a bolt of lightning. 'We've done it' the artillerymen thought, quite relieved. 'Yes, we have done it', said the gun captain. But their expressions suddenly changed when one yelled out, 'It's moving again!' There was no doubt this was so as the gleaming tracks soon approached the howitzer, crushed it like a toy into the soil, and continued on its way as though this was the most natural thing in the world.

This T-34 obr. 1940 ended up in a marsh during fighting with Panzergruppe.4 in the Baltics in June 1941. It is fitted with the original L-11 gun in the initial 34.30.sb-1 welded turret but lacks the PKO periscope in the turret hatch that was deleted from tanks produced in March 1941.

In what became the most famous early encounter with the KV tank, a single KV of the 4th Regiment, 2nd Tank Division managed to block a crossroads near Raseiniai on June 24–25 in spite of repeated attacks by tanks and anti-tank guns of the 6.Panzer-Division. In spite of these occasional shocks, the Red Army failed to stop the German attack. The 2nd Tank Division lost most of its equipment in the first two days of fighting and its headquarters was overrun on June 26.

A KV-2 obr. 1940 of the 2nd Tank Division, 3rd Mechanized Corps in a dug-in position near Jūrė, southwest of Kaunus, Lithuania on June 27, 1941. This tank is fitted with the initial style of turret built in July–August 1940. Most of these early types were in the 2nd and 12th Tank Divisions.

The 21st MK was only partially formed at the start of the war but was sent into Latvia from the Moscow Military District. On June 25, the corps was ordered to Daugavpils to prevent Heeresgruppe Nord from crossing the Western Dvina and Dauguva rivers in Latvia. The 8.Panzer-Division and other German units arrived in this sector on June 28 and fought for several days against the 21st MK and its neighboring units. This fighting culminated in a battle in the Rēzekne river valley on July 3

A T-34 obr. 1941 of the 6th Mechanized Corps, with the improved Mariupol 34.30.182-5 cast turret and F-34 gun, that slid off a road into the reservoir outside Zelva about 33km west of the Slonim road junction in Belarus in late June 1941.

that largely destroyed the corps. In spite of the growing Soviet resistance, Heeresgruppe Nord crossed the Dvina river in multiple locations in the first week of July. The defense of the Baltic sector from June 22 to July 9 cost the Red Army 2,523 tanks and the destruction of three mechanized corps as well as many smaller tank units.

Towards the Smolensk Gate

The strongest German thrust took place in the Heeresgruppe Mitte sector, consisting of Panzergruppe.3 and Panzergruppe.2 with a total of nine Panzer divisions and about 2,100 Panzers. This attack was aimed at Moscow, traveling along the usual warpath through Belarus, dubbed the Smolensk Gate. This followed the Warsaw–Moscow highway along the route Białystok–Grodno–Minsk–Smolensk–Moscow.

Facing Heeresgruppe Mitte were five Soviet mechanized corps (6th, 11th, 13th, 14th, and 17th) of the Western Special Military District and elements of the 3rd MK in southern Lithuania, totaling about 2,300 tanks. The 17th MK had barely any tanks and was converted into an infantry unit before being committed to combat.

D

IMPROVISED AFVS DURING OPERATION *BARBAROSSA*

1. NI Tractor Tank, 210th Sep. Tank Battalion, Primorsky Army, Odessa, autumn 1941. Due to the shortage of tanks in Odessa during the siege, the January Uprising Railway Workshop, in conjunction with neighboring factories, created 69 NI (*Na ispug*: fearsome) tractor tanks. These consisted of STZ-5 artillery tractors protected by an armored superstructure. Some of these used improvised turrets while others like this one were fitted with one of the machine gun turrets from the T-26 light tank. They were also called *Yanvarets* tanks from the factory name (*Yanvar:* January). They were formed into a battalion under Sr. Lt. N.I. Yudin, though in practice, they were broken up into small formations to support various Soviet infantry units. Some of the NI tanks carried simple tactical markings as seen here.

2. ZIS-30 Tank Destroyer, 18th Tank Brigade, Western Front, autumn 1941. The ZIS-30 was an improvised tank destroyer built by Plant No. 92 in Nizhny Novgorod consisting of a T-20 Komsomolets armored artillery tractor fitted with a ZiS-2 57mm anti-tank gun. About a hundred were converted starting in late September 1941. These were deployed in the motorized rifle battalions of tank brigades of the Western, Briansk and Southwestern Fronts. Many of these were painted at the factory in a three- or four-color 1941 camouflage as seen here. They saw use in the fighting on the approaches to Moscow in the late autumn and early winter of 1941.

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A KV-1 obr. 1941 with the F-32 and the initial turret with 75mm armor. This tank from the 6th Mechanized Corps was put out of action during late June near Zelva, Belarus and shows several impacts from German 37mm guns.

On the northern shoulder of this attack, the first confrontation involved the 7.Panzer-Division facing the 5th Tank Division of the 3rd MK for the Nieman river bridges near the Lithuanian town of Olita. The 5th Tank Division was well equipped, with 50 new T-34 tanks out of its 268 tanks. Intense tank fighting broke out immediately after the 7.Panzer-Divison crossed the border. OLt. Horst Ohrloff, a holder of the Knight's Cross of the Iron Cross, described the day's fighting as "The hardest combat ever conducted by the 7.Panzer-Division in World War II." The Soviet attack was brave but amateurish, and the Panzer-Regiment.25 commander, Obst. Karl Rothenberg, characterized the battle as "the hardest fight of my life." By the end of the day, the Soviet 5th Tank Division had lost at least 90 tanks. The heaviest losses were suffered by the 9th Tank Regiment that had defended the northern Olita bridge. It lost 73 of its 117 tanks (62 percent) including 27 of its 44 T-34 tanks. The Red Army resistance was finally broken when the Soviet defenses near Olita were outflanked by Panzer divisions on either side. The 7.Panzer-Divison pursued the 5th Tank Division toward the Lithuanian capital of Vilnius, and by the third day of fighting, the Soviet unit had been reduced to only three tanks.

By far the strongest Soviet formation in this sector was the 6th MK in the Białystok area with 1,021 tanks including 452 T-34 and KV tanks. German infantry units, mainly from the XX.Armeekorps, advanced towards Grodno with little contact with Soviet tanks on the first day. Late on June 22, the Western Front headquarters ordered Lt Gen. Ivan V. Boldin to form a Cavalry-Mechanized Group consisting of the 6th MK, 11th MK, and the 6th Cavalry Corps. The 11th MK was much weaker than the 6th MK with only 237 tanks of which only 31 were new types including 3 KVs and 28 T-34s. It was headquartered in Volkovysk with its 29th Tank Division based in Grodno. The original mission of Boldin's group was to defeat German Panzer forces that had penetrated the border south of Białystok.

As the 6th MK began moving, its columns were repeatedly bombed by the Luftwaffe. The advance proved difficult due to the congestion on the roads from large number of retreating Soviet troops intermingled with civilians. On the evening of June 22, the Western Front commander, Gen. Dmitriy G. Pavlov, ordered an abrupt change of plans, instructing Boldin to change the direction of his counter-attack from south of Białystok to the northeast towards Grodno. This road march was again subjected to Luftwaffe attacks. The 7th Tank Division lost 63 tanks broken down, bombed, or otherwise disabled by the afternoon of June 23. Boldin's headquarters were bombed that afternoon; Boldin survived but many of his senior staff was killed. The 6th MK did not reach the starting point at Krynki until the morning of

The T-28 obr. 1939 introduced the new L-10 76mm gun that offered better anti-armor performance than the short KT-28 gun previously used. This example was captured by the Finnish army and used in the 1941 fighting in Karelia. (SA-kuva)

June 24, at which point many of its tanks had nearly exhausted their fuel due to the continual road marches and the destruction of many of their supply trucks by Luftwaffe attacks.

A BT-7 tank battalion of the 47th Tank Regiment, 29th Motorized Division, 6th MK hit the 256.Infanterie Division near Kuźnica. Although the attack was repulsed, it startled the XX.Armeekorps which had believed that the Red Army in this sector was in full retreat based on the previous lack of strong resistance. German observation aircraft were soon over the scene and reported the area swarming with Soviet vehicles including "super-heavy" tanks. This led the 256.Infanterie-Divison to order their troops to take up defensive positions and to bring forward all available artillery including flak guns. The division was supported by two batteries of StuG.Abt.210 with nine StuG III Ausf.B. The initial Soviet tank attacks tended to be small-scale and piecemeal. For example, a German infantry regiment on Hill 236 were subjected to no fewer than nine separate tank attacks from three different directions during the day. By day's end, the 256.Infanterie-Divison reported that it had repelled 12 major attacks by 150 Soviet tanks. They claimed to have knocked out 80 Soviet tanks: 20 by the StuG III batteries and the rest by 37mm anti-tank guns, field guns, and 88mm Flak guns.

In the meantime, the 11th MK began attacking German positions immediately southwest of Grodno, including Infanterie-Regiment.84 of the 8.Infanterie-Division. Once again, the Soviet tank attacks were determined, but disjointed and costly. By day's end the 11th MK had been reduced to only about 10 T-34 tanks and 50 T-26 light tanks of its original 241 tanks due to German artillery fire, air attack, and mechanical breakdowns.

E

BATTLE OF THE NIEMAN BRIDGES, LITHUANIA, JUNE 1941

Although the early encounters between Panzers and Soviet tanks were very one-sided, there were numerous small exceptions. During the attack by the 7.Panzer-Division towards Alitus in Lithuania on June 22, 1941, the main river bridge over the Nieman was protected by tanks of the Soviet 9th Tank Regiment, 5th Tank Division. The T-34 of Sgt. Makogon was credited with knocking out the first PzKpfw IV that attempted to cross the bridge, and, during the course of the day, he was credited with knocking out six German tanks in the ensuing fighting around the town as seen here.

This T-26 obr. 1938 has ended up in a marsh outside Tallin in Estonia. It was originally built as a radio tank, evident from the fittings on the turret side. This tank features the new protective cover over the radiator opening, nicknamed the rumble seat (*zadnitsa*) by tank crews, that was introduced in the summer of 1939 based on lessons from the Spanish Civil War.

Boldin's Cavalry-Mechanized Group resumed its attacks the morning of June 25 in conjunction with Soviet infantry and cavalry units. Nevertheless, by afternoon, it was evident that the counter-attack towards Grodno had failed and that the whole of the Soviet 3rd and 10th Armies were at the risk of being encircled and destroyed. Gen. Pavlov ordered a withdrawal towards Slonim on the night of June 25/26. Gen. Boldin ordered his two mechanized corps to destroy any tanks that were out of fuel or that would not survive a 300–400km road march. By the end of the day, the 11th MK had been reduced to about 30 tanks.

The Volkovysk–Slonim road became known as the "road of death" by survivors of the retreat. The 4th Tank Division had lost virtually all of its tanks by the following day; the 7th Tank Division of the 6th MK was able to maintain some combat strength for a few days longer. At Slonim on July 1, all that remained to the two mechanized corps was a single KV tank and two T-34 tanks.

South of this confrontation was the 13th MK, headquartered at Bielsk-Podlaski, south of Białystok. The division's main strength was in its 25th Tank Division that contained 228 of the corps' 295 tanks. This division was equipped mainly with T-26 tanks. The 31st Tank Division, deployed along the Soviet–German frontier with 40 T-26 tanks, was overwhelmed early on the first day and remnants retreated towards Białystok. The 25th Tank Division was located in Łapy, southwest of Białystok and was ordered to take up defensive positions along the Nurzec river. Its reconnaissance battalion was on the border in the village of Brańsk and became surrounded in the opening hours of the German attack.

The German attack in this sector was based around Infanterie-Regiment.463 of the 263.Infanterie-Divison, supported by a battery of StuG III assault guns of StuG-Abt.226. The Germans seized much of Brańsk on June 22, leading to a series of ten Soviet counter-attacks by the 25th Tank Division and the 208th Motorized Division. The presence of the StuG III assault guns led the 13th MK to report that it was engaging a large German Panzer formation. On the evening of June 22, the Soviet 10th Army decided

to withdraw from the border area and set up a new defensive line along the Narva and Orlanka rivers. However, these instructions did not reach all units, leading to a chaotic retreat.

The 13th MK commander, Gen. Maj. Pëtr N. Akhlyustin, decided to hold on to Brańsk to prevent the Germans from interfering with the retreat. He ordered his forces in Brańsk to hold the town for as long as possible. Intense street fighting continued through June 23 with the Germans claiming to have destroyed more than 60 Soviet tanks by evening. The StuG III assault guns claimed to have knocked out 39 Soviet tanks in two days of fighting, with the crew of Lt. Steimann alone claiming 16.

Late on June 23, the remaining elements of the 13th MK in the area began withdrawing. The 113th Tank Regiment of the 25th Tank Division still had about 100 T-26 tanks at the time but lost many of them during the withdrawal as they were confronted by other German units that had bypassed Brańsk. The corps was largely destroyed during the ensuing retreat, with its last two tanks being knocked out on July 4 during the fighting for the Minsk pocket.

At the southern edge of the Western Front was the 14th MK, located near the fortress city of Brest-Litovsk. Of its 534 tanks, 528 were T-26 infantry tanks. The corps' 22nd Tank Division was located on the southern side of Brest, and so close to the border that its base was clearly visible from the German side of the frontier. As a result, the base came under intense artillery fire at the start of the invasion, with heavy loss of personnel and equipment. Further losses were suffered from air attack when the division attempted to move eastward to the corps staging area around Žabinka.

The first major contact with German forces came after noon when the 30th Tank Division counter-attacked the spearhead of the 18.Panzer-Divison at the cost of nearly a third of its tanks. Late in the day, the corps was ordered to prepare for a full-scale counter-offensive against the German forces that had crossed the Bug river on the first day. This was entirely impractical since the corps' 205th Motorized Division lacked the trucks

A factory-fresh T-34 obr. 1941 in 1941. This tank is fitted with the improved Mariupol 34.30.182-5 cast turret and F-34 gun. It has a full complement of stowage including the rectangular fuel cannisters on the side, and a full set of ice cleats.

needed to transport it into action. As a result, when the counter-attack began around dawn on June 23, it was conducted by the corps' two tank divisions with no infantry support. The 22nd Tank Division had been reduced from 256 tanks to about a hundred during the first day of fighting both due to air attacks and mechanical breakdowns. On the morning of June 23, it had some initial success against German infantry near Žabinka. However, the 3.Panzer-Divison and 31.Infanterie-Divison intervened, sending the 22nd Tank Division into a retreat toward Kobryn. By afternoon, its strength had been reduced to 67 tanks. The 3.Panzer-Divison continued to press the attack. The 22nd Tank Division commander, Gen. Maj. Viktor P. Puganov, was killed when he ordered his tank to ram an advancing German tank. The division attempted to defend the Mukhvets canal with its remaining 40 tanks, but the 3.Panzer-Division secured a crossing in the late afternoon.

On June 23, the 30th Tank Division had about 120 tanks operational out of its original 211. Its morning attack faltered immediately as the division was bypassed by the 17.Panzer-Divison on its northern flank. The division withdrew towards Pruzhany, with its columns bombed and strafed while on the road. On reaching Pruzhany, it was attacked by the 17.Panzer-Division and pushed out of the town. Ordered to retake Pruzhany, it was battered again and forced to retreat in the afternoon.

By the evening of June 23, most of the 14th MK was withdrawing toward Syalets. Under continual German pressure, the corps was pushed back towards Sinnyavka, about 200 km from their bases near Brest. By the afternoon of June 24, the 30th Tank Division had been reduced to about 25 tanks and most of the corps was isolated behind the Panzer spearheads. The Panzergruppe.2 commander, Gen. Heinz Guderian, was nearly captured in the afternoon when he inadvertently drove through a retreating column of the 22nd Tank Division. Although the 14th MK conducted a number of rearguard actions on June 24, for all intents and purposes, it disintegrated amidst the flow of the Panzer divisions out of their Bug river bridgehead. Remnants of the corps managed to retreat along the Warsaw highway, but most of the corps was enveloped over the following week during the Minsk encirclement.

An early production KV-1 with L-11 gun of the 15th Tank Regiment, 8th Tank Division, pushed off the road outside of Lvov in June 1941.

Soviet tank units that survived the original border battles were caught up in the encirclement battles along the Białystok–Minsk highway. The Red Army acknowledged losing 4,799 tanks in the defense of the Western Front through July 9.

On the Kiev Axis

The heaviest concentration of Soviet tanks was in Ukraine. The Kiev and Odessa Military Districts contained ten mechanized corps with 5,420 tanks, including about 815 T-34 and KV tanks. Opposing them was Heeresgruppe Süd spearheaded by Panzergruppe.1 with five Panzer divisions and about 780 tanks.

The original version of the T-26 obr. 1931 was fitted with twin turrets. This example was captured by the Finnish Army in the 1939–40 war and put on display in Helsinki as seen here. (SA-kuva)

At the forefront of Panzergruppe.1 were the 11.Panzer-Division that crossed the Bug river at Sokal and the 14.Panzer-Divison that crossed near Vladimir-Volynskiy. Heeresgruppe Süd had earmarked good roads from the border into Ukraine that were dubbed the "Panzerstrasse." The most intense fighting took place along this route.

The Soviet 5th Army ordered the 22nd MK to counter-attack the 14.Panzer-Divison, but, due to radio failures, it only managed to send a T-26 battalion that was promptly annihilated. Around midnight on June 22/23, Moscow ordered the Southwestern Front to launch a major counter-attack with five mechanized corps against the Panzer spearheads on June 24. Poor radio communications and the dispersion of the Soviet tank units made this impossible. On the morning of June 24, the 14.Panzer-Division clashed with the 19th Tank Division of the 22nd MK near the villages of Voynitsa and Aleksandrovka, knocking out about two-dozen T-26 tanks. The roads leading to the battlefield were littered with broken-down tanks of the retreating 22nd MK and the corps commander who had been killed.

The 15th MK was ordered to move towards the road junction of Radzekhov, a major town on the Wehrmacht's planned Panzerstrasse. On June 23, the spearhead of the 11.Panzer-Divison pushed the 10th Tank Division, 15th MK out of Radzekhov. Reinforcements from the 15th MK as well as detachments from the 4th MK soon arrived and launched a counter-attack on the town. A report from the German XLVIII.Panzerkorps later commented that "What we did not anticipate was the fanatical fighting spirit of the Russian tank crews. Despite our obvious advantage in terms of numbers and anti-tank weapons, the enemy light tanks continued to attack, despite their losses." Soviet tank losses were about 70 and German less than ten total losses plus additional Panzers damaged.

The 11.Panzer-Divison headed down the Panzerstrasse for Dubno, arriving there on June 25. The 15th MK was reinforced in its defense of Dubno by the once-powerful 8th MK, but this unit had been sent on a

A factory-fresh T-34 obr. 1941 of the 48th Separate Tank Battalion, 23rd Army, captured by Finnish troops near Sevastyanovo (Kaukola) on the Karelian isthmus on August 17, 1941. This tank is fitted with the new F-34 gun in a welded turret and it is marked with the tactical number 30/204. (SA-kuva)

circuitous 600km road-march losing a large portion of its tank strength to mechanical breakdowns and fuel exhaustion. Poorly coordinated attacks against the German defenses led to heavy Soviet tank losses. The Germans had discovered the command posts of both the 8th and 15th MK and bombed them that evening, further intensifying the Soviet plight.

One of the strongest units of the Southwestern Front, the 4th MK, was wasted on a series of misadventures chasing imaginary German Panzer units but instead became bogged down in costly small-scale encounters with German infantry. On June 24, there was a battle for Nemirov when the 71.Infanterie-Divison was counter-attacked by BT-7 tanks of the 53rd Tank Regiment, 81st Motorized Division, 4th MK.

The Southwestern Front attempted to make a coordinated pincer attack against the 11.Panzer-Division in Dubno and 14.Panzer-Division in Lutsk,

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BT TANKS DURING OPERATION *BARBAROSSA*

1. BT-7 obr. 1937, 5th Tank Division, 3rd Mechanized Corps, Lithuania, June 1941. The 5th Tank Division was created in June 1940 based on the pre-war 2nd Light Tank Brigade. This brigade had taken part in the invasion of Lithuania in June 1940. For the operation, tanks were painted with a white cross on the turret roof as a form of air identification marking. In many cases, it was never painted over and so was present on many of this unit's tanks in 1941.

2. BT-7M, 1st Company, 2nd Battalion, 53rd Tank Regiment, 81st Motorized Division, 4th Mechanized Corps, Battle of Nemirov, western Ukraine, June 1941. The 53rd Tank Regiment was a rare example of a unit in June 1941 with a comprehensive set of tactical markings. This type of marking was very uncommon at this time and most Soviet tanks carried no markings at all except for air-identification markings on the roof. This regiment's marking was a white rhomboid, the standard Soviet map symbol for a tank, with a letter/number below. The letters indicated the company (*rota*) and battalion, (*batalön*) in the order of the Cyrillic alphabet: A, B, V (1st, 2nd, 3rd Companies of the 1st Battalion); G, D, E (1st, 2nd, 3rd Companies of the 2nd Battalion); Zh, Z, I (1st, 2nd, 3rd Companies of the 3rd Battalion); and K, L, M (1st, 2nd, 3rd Companies of the 4th Battalion). The number after the letter indicated the platoon (*vzvod*), with three platoons of five tanks each in the company. The regiment used several air identification symbols on the roof in late June including a white band perpendicular to the axis of the tank, a large rhomboid as seen here, a small rhomboid on one hatch, and a large white star.

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A T-34 obr. 1941 of the Soviet 32nd Tank Division along the road 300m northwest of the village of Jazów Stary (now Stariy Yar) in Ukraine on June 25, 1941. This is an example with the improved Mariupol 34.30.182-5 cast turret with F-34 gun that had the side vision ports as separate parts and had splash strips on either side of the gun mantlet.

adding the 9th and 19th MK to the battle. Not only was the Soviet counter-attack disorganized, but Panzergruppe.1 committed two more Panzer divisions to the fighting. The 8th MK made a successful assault on June 27 against 11.Panzer-Division and 16.Panzer-Division near Dubno, one of the few occasions when a Soviet mechanized corps made a successful penetration of German defenses. However, the following day, the Germans managed to trap both of the tank divisions of the 8th MK in a pocket. Some of the troops managed to escape the pocket on the night of June 30 by taking advantage of the fog, but they left most of their 200 tanks behind.

The commander of the 8th MK, Gen. Lt. D. I. Ryabyshev later noted: "From 22 to 26 June 1941, we carried out movements much beyond normal forced marches without being able to observe the elementary prescribed requirements for maintaining equipment and resting personnel. The equipment arrived at the battlefield after having covered distances of 500 km. As a result of this, 40 to 50 percent of the tanks were broken down for technical reasons … and abandoned on the routes of march of the division. As the consequence of such rapid marches, the remaining tanks were technically unprepared for combat."

In the north, the 13.Panzer-Division and 14.Panzer-Division staged a coordinated attack on the 9th and 19th MK, dislodging their defenses. By July 1, 11.Panzer-Division had raced ahead to Shepetivka, a rail junction on the Goryn river. At the same time, the 13.Panzer-Division and

A pair of T-28 medium tanks of the 8th Mechanized Corps on the Southwestern Front in Ukraine in July 1941.

The BT-7 obr. 1935 used the same Izhora welded turret as the previous BT-5 and T-26 obr. 1933. This tank was one of the last defenders of Petrozavodsk on Lake Onega when taken by Finnish troops in October 1941. (SA-kuva)

14.Panzer-Division reached the old fortress city of Novgorod-Volynskiy. The fighting in the Brody-Dubno area was history's largest tank battle to date, involving about 3,800 Soviet tanks against 600 Panzers. Unlike the fighting in Belarus, Panzergruppe.1 was not able to completely entrap all the Soviet formations. Of the six mechanized corps that took part in the battle of Brody-Dubno, their strength fell from 3,783 at the start of the campaign to only 289 tanks on August 1, 1941, and 114 on September 1. Total Soviet tank losses in western Ukraine through July 6 were 4,381. In contrast, Panzergruppe.1 suffered 85 total tank losses up to July 5 with another 200 Panzers under repair due to battle damage and breakdowns.

The Great Tank Massacre

The first three weeks of Operation *Barbarossa* cost the Red Army 11,703 tanks. This was about half of its pre-war tank force but included most of its new T-34 and KV tanks. What was left was mostly older and obsolete tanks. Eighteen of the Red Army's 29 mechanized corps had been destroyed, including all of the best-equipped corps. In recent years, this catastrophe has been called the "Tank Massacre" (*tankoviy pogrom*) by Russian historians.

On 15 July, STAVKA (Soviet High Command) disbanded the mechanized corps, recognizing that they had been a complete failure. In place of the huge and unwieldy mechanized corps, STAVKA reinstituted the tank brigade as the largest tactical armored formation. These new brigades were organized around a tank regiment and a motor rifle battalion, with a nominal strength of 93 tanks. On paper, each tank regiment included a company of seven KV tanks, a company of 22 T-34 tanks, and the remainder of the unit was filled out with whatever light tanks were available. In practice, these brigades were usually smaller and were composed of whatever tanks were available at the time.

One of the perverse consequences of the Tank Massacre was that Soviet tank losses during the subsequent summer disasters were not especially high since so few tanks were available. The single largest disaster, the Kiev encirclement in late summer, only involved the loss of 411 tanks even though the Wehrmacht captured an astounding 435,000 Soviet troops.

Soviet tank forces began to return to the battlefield in significant numbers in the autumn as tanks were collected from the distant Soviet republics and sent westward to help defend Moscow. New T-34 and KV tanks trickled onto the battlefield. The main Soviet tank plants in Leningrad and Kharkov were isolated or overrun and it took time for new plants to ramp up their production.

In mid-September, the Red Army's Western and Briansk Fronts defending Moscow had only about 720 tanks of which only 134 were T-34s. By the middle of October 1941, the Soviet tank forces on the approaches to Moscow numbered less than 600 tanks, but about 260 were the new T-34s and KVs. The Red Army managed to defeat the Wehrmacht's Operation *Typhoon* offensive against Moscow, but at the beginning of January there were only 2,200 tanks in front-line service, a mere tenth of its starting strength on June 22, 1941.

Soviet tank losses in 1941 by campaign

Operation	Period	Losses	Avg. loss per day
Baltic defensive operation	22 Jun–9 Jul 1941	2,523	140
Belorussian defense operation	22 Jun–9 Jul 1941	4,799	267
Western Ukraine defensive operation	22 Jun–6 Jul 1941	4,381	292
Karelian operation vs. Finland	29 Jun–10 Oct 1941	546	5
Kiev defensive operation	7 Jul–26 Sep 1941	411	5
Leningrad defensive operation	10 Jul–30 Sep 1941	1,492	18
Smolensk operation	10 Jul–10 Sep 1941	1,348	21
Donbas–Rostov defensive operation	29 Sep–16 Nov 1941	101	2
Moscow defensive operation	30 Sep–5 Dec 1941	2,785	42
Tikhvin offensive	10 Nov–30 Dec 1941	70	1.4
Rostov offensive	17 Nov–2 Dec 1941	42	3
Moscow offensive	5 Dec 1941–7 Jan 1942	429	13
Sub-total (listed campaigns)		*18,927*	
Total	**22 Jun–31 Dec 1941**	**20,500**	**108**

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KV TANKS DURING OPERATION *BARBAROSSA*

1. KV-2, 27th Tank Regiment, 14th Tank Division, 7th Mechanized Corps, Western Front, Battle of Senno, June 1941. Contrary to model kits and popular illustrations, the KV-2 artillery tank very seldom carried any markings other than air identification markings on the roof. The 7th Mechanized Corps was a rare exception. The 27th Tank Regiment carried a rhomboid with the number 4 inside on the rear of the turret; the 28th Tank Regiment had the number 5 in a rhomboid. As was common in the early summer, the tanks were periodically marked with a temporary air identification marking on the roof, in this case, a square.

2. KV-1, 106th Sep. Tank Battalion, 23rd Army, Leningrad Front, October 1941. In the autumn of 1941, Soviet tanks sometimes repeated the air identification marking on the turret sides and rear as well as on the roof. This was usually applied in haste with some type of temporary paint, so the marking was apt to be irregular. The use of tactical numbers on the turret also became more widespread in the autumn. This example probably indicated the 2nd Company, 1st Platoon, 2nd Tank. The red Cyrillic N was probably a cipher for the battalion. This KV-1 is fitted with the improved turret with 90mm armor introduced in June 1941 as well as the added appliqué armor panels on the hull.

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Maj. M. P. Baranov of the 5th Tank Regiment, 172nd Motorized Division instructs his officers in front of his T-34 in Crimea in September 1941. This tank is fitted with the F-34 gun in a cast turret.

BATTLE ANALYSIS

The Tank Massacre of June 1941 was not due to technical factors of tank design so much as broader failings of the Red Army. Stalin's failure to recognize Hitler's intentions was at the heart of the strategic disaster. The Red Army mistakenly decided to raise 30 mechanized corps concurrently instead of creating them sequentially. As a result, only a handful of mechanized corps were near full strength in June 1941. Most were only partially formed, lacking critical equipment and troops, and in a chaotic state with poorly trained staff and personnel.

The hasty decision to form these gargantuan formations was accompanied by considerable confusion among senior commanders about how the formations were to be used. The Soviet mechanized corps mimicked the Panzerkorps, but the German formation was configured for an aggressive, offensive war of maneuver. There was no clear conception of how the Soviet mechanized corps should be used in a defensive posture as occurred in 1941. The tactical doctrine for the interaction of mechanized corps alongside rifle corps had not been fully developed by the time the war broke out.

At the divisional level, combined-arms tactics had not been adequately practiced, and there were few if any large-scale training maneuvers prior to the outbreak of the war. As a result, the Soviet tank divisions tended to fight as small, disconnected units, a company here, a battalion there. There was little coordination between tanks, infantry, and artillery.

At the small unit level, training was poor, especially compared to a combat-hardened opponent such as the Wehrmacht. Due to the limited durability of Soviet tanks, the new tank battalions were limited to a few tanks for training purposes while the rest remained untouched as war-reserve. Not only was there not enough training in basic tank crew skills such as driving, weapons firing, and crew coordination, but there was very little unit training by tank platoons or tank companies.

A BT-7 obr. 1937 has foundered in a ditch against a tree during the Talinjärvi encirclement battle with the Finnish army near Porosozero (Porajärvi) on July 21, 1941.

Gen. Georgi Zhukov, at the time the head of the Reserve Front, noted in his report to Moscow that:

> I have concluded that the unacceptable ignorance of the use of tanks and tank units in battle has resulted in their improper use with heavy losses in manpower and equipment. The formation commanders did not give time to conduct tank reconnaissance and organize the combined actions of tanks, infantry, artillery, and aviation. Co-operation was organized not on the ground, but far from the battlefield, on maps. The tanks rushed to attack without any information about the location of the enemy's weapons or the nature of the terrain. The commanders of small units and combined-arms formations assigned unclear and dubious tasks to the tanks. Support for the tanks by aviation, infantry and artillery was not organized. Coordination of artillery requests and target designation were not conducted. Tanks were hit by their own artillery due to misdirected artillery fire. When the tanks moved forward, the infantry, as a rule, did not advance behind the tanks and did not consolidate the lines captured by the tanks. The tanks, acting alone, suffered needless losses and were compelled to withdraw. Senior tank commanders did not show the necessary firmness in front of combined-arms commanders in the correct use of tanks, and casually turned over control of tank-infantry support groups. They failed to organize the evacuation of damaged and bogged-down tanks from the battlefield and did not take measures to immediately send the damaged tanks to collection points for their recovery and repair.

Col. Pavel Poluboyarov, head of the Armored Directorate of the Northwestern Front, gave his observations in a report to Moscow after the start of the campaign:

> There was too much haste sending the mechanized corps into battle without first organizing cooperation with other combat arms. Poor coordination among the senior headquarters led to ignorance of the situation at the front and misguided missions without prior coordination between the infantry

The war with Finland in 1939–40 revealed the shortcomings of the armor on the T-28. In 1940, the Kirov plant in Leningrad began rebuilding tanks with appliqué armor. A total of 114 were completed before the start of the war. This tank from the 8th Tank Division was abandoned near Zolochiv, to the east of Lvov in June 1941.

and tanks. The management within the tank formations was poor. The lack of air support led to significant losses, especially on road marches. The old fleet of BT and T-26 tanks suffered from a poor technical state. Continuous road marches over distances of up to 1,000 km completely destroyed the powertrain. The tanks were thrown into the enemy positions where some were knocked out and others abandoned though still operable. The Germans have well-organized anti-tank defense and strong reconnaissance that gives them the ability to quickly concentrate anti-tank guns where [the Red Army] tries to use tanks.

At a technical level, there were two main failings of Soviet tanks – poor ergonomic design of the turret and lack of durability. Soviet tanks relied on two-man turrets, with the commander either serving as the gunner or as the loader. This distracted the commander from his leadership role. In addition, the commander lacked a vision cupola, and Soviet tank hatches usually opened forward, limiting his ability to view the situation with his head outside the turret. The combination of inadequate training, excessive tasks in combat, and poor situational awareness made Soviet tanks very vulnerable in close combat against the veteran German Panzer crews.

Most Soviet tanks such as the T-26 and BT were based on late 1920s technology that was not especially durable. Tanks typically had a lifetime of about 300 engine hours at which point they needed a complete factory reconstruction. Many Soviet tanks were near the end of their service life when war broke out. Forced marches plus poor driving led to numerous mechanical breakdowns. This was exacerbated by a lack of spare parts. Inadequate maintenance training of the novice crews resulted in the abandonment of tanks that had suffered minor mechanical problems. The new tanks such as the T-34 were still immature, and the industry was struggling to maintain engine life to the required 300 hours.

On the positive side, the armor protection of the T-34 and KV tanks came as a great shock to the Germans. Most of the engagements with the T-34 and KV were not tank-vs.-tank duels but occurred with the infantry's towed

A Soviet T-26-1 obr. 1939 of the 57th Tank Division, 28th Mechanized Corps in Iran on September 17, 1941 being inspected by British officers. This final version of the T-26 series featured a stamped mantlet and enhanced 20mm side hull armor below the turret. In late August 1941, British and Soviet forces launched Operation *Compassion* against Iran to gain control of communication networks for the shipment of Lend-Lease supplies.

37mm anti-tank guns. A 37mm battery of Panzerjäger-Abt.42 reported on July 8, 1941: "A completely unknown type of tank appeared before us. We opened fire immediately, but the armor was not penetrated until the range was 100 meters. Armor piercing projectiles stuck in the armor plating at 200 meters." Another reported: "Half a dozen anti-tank guns fire at the T-34, which sound like a drum-roll. But he drives staunchly through our lines like an impregnable prehistoric monster." One determined 37mm gun crew reported firing 23 times against a single T-34 tank, only managing to jam the tank's turret ring. In their dispatches, German field commanders began to mention the "tank terror" that struck the infantry when Red Army tanks appeared. Soviet officers noted with satisfaction that the appearance of the new tanks, especially the heavy KV tank, caused German infantry units to flee.

In spite of their occasional small-scale victories, the new T-34 and KV tanks failed to have a decisive impact during Operation *Barbarossa* due to the pervasive deficiencies of the Red Army. A report on July 8, 1941 was typical:

> There were exceptionally great losses of KV-2 tanks in the 41st Tank Division. Of the 31 tanks available to the division, by July 6, 1941 only 9 remain. The enemy knocked out five, twelve were blown up by their own crews, and five were returned for major repairs. The heavy losses of the KV tanks are attributable primarily to the poor technical training of the crews, their poor knowledge of the tank systems, as well as an absence of spare parts. When the crews were unable to eliminate malfunctions on stalled KV tanks, there were many occasions when they had to blow them up.

By late July 1941, few T-34 or KV tanks had survived the first deadly weeks of the campaign.

FURTHER READING

The bibliography here puts an accent on campaign histories, especially those focused on tank battles, rather than the numerous monographs on various Soviet tank types. Those are covered in the many Osprey New Vanguards by the author dealing with Soviet tank development.

The best coverage of the Soviet mechanized corps is the Drig account, while the Askey and Sharp books are handy for those who do not read Russian. The first volume of the Soviet tank trilogy by Solyankin and his team is the best overview of Soviet tanks of the period up to 1941. The Soviet General Staff study cited below, "Collection of Military Documents of the Great Patriotic War Volume 33," is a digest of surviving reports on the mechanized corps in 1941. Parts of it are available on the internet.

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AUTHOR'S NOTE

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GLOSSARY

GABTU	*Glavnoe avtobronetankovoe upravlenie:* Main Armored Vehicle Directorate
MK	*Mekhanizirovanniy korpus*: Mechanized Corps
Obr.	*Obrazets:* model or type
PKO	*Pribor krugovogo obzora*: all-around periscope on T-34
PribOVO	*Pribaltitskiy Osobviy Voenniy Okrug:* Baltic Special Military District, later Northwestern Front
RGK	*Reserv Glavnogo komanovanniya:* High Command Reserve
ZapOVO	*Zapadniy Osobviy Voenniy Okrug*: Western Special Military District, later Western Front